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(1916-1990)

November 6, 1990

Mr. John Hamill
Office of Regional Counsel
Environmental Protection Agency
Region X
1200 Sixth Avenue, SO-125
Seattle, Washington 98101

Dear Mr. Hamill:

Re: Pacific Wood Treating Corporation
EPA ID No. WAD 009036906

This letter will follow up on your letter to me, dated August 7, 1990, and our telephone conversation during that week.

As I indicated to you during our telephone conversation, I was rather surprised by your letter of August 7, 1990. During our telephone conversation, we discussed the status of the ground water monitoring system which makes up a part of the closure plan. You had the impression, both during our telephone conversation and at the time of your August 7, 1990, letter, that Pacific Wood Treating Corporation was doing nothing toward resolving the outstanding complaint.

As I indicated to you during our conversation, this was simply not true. When we met with you and met various employees of the Agency earlier this year, the conflict that had arisen was the report of David J. Newton Associates, Inc., the consultant hired by the company, and the report in September of Robert S. Farrell, the consultant hired by the Agency. The conflict arose from reports submitted by Mr. Newton as reviewed by Mr. Farrell. Mr. Farrell had submitted a letter under date of September 21, 1989, which had disagreed with some of Mr. Newton's findings.

As a result of the meeting with you, it was agreed that Mr. Newton and Mr. Farrell would see if the differences as to the

ground water monitoring system could be resolved as between them. I remember this distinctly because Ms. Bailey, of the Agency, was insistent that she participate in any telephone conversations between Mr. Farrell and Mr. Newton on this point. The final resolution was Mr. Farrell and Mr. Newton would discuss these matter and then advise as to whether or not the differences could be resolved. A telephone conference would then take place with Mr. Farrell, Mr. Newton, Ms. Bailey, myself, and such other employees of the agency that wanted to participate.

It was agreed during that meeting, and also during our telephone conversation, that there could not be an acceptable closure plan unless a ground water monitoring system acceptable under the EPA's regulations could be agreed upon by the parties. Mr. Newton, under our direction, has been discussing the ground water monitoring system with Bob Farrell in accordance with the discussions reached at our meeting.

During our telephone conversation in August, I indicated to you that I would report back to you as to where the company thought the discussions between Mr. Newton and Mr. Farrell stood. After our conversation, I met with David Newton and with Dr. Bryant Adams for a status conference. Mr. Newton indicated that he had been in touch with Mr. Farrell and that on August 13, 1990, he had federal expressed to Mr. Farrell a memorandum which addressed the ground water monitoring system concerns. I have enclosed a copy of this memorandum for your review.

I asked Mr. Newton to follow up with Mr. Farrell after about thirty days so that we could keep this matter moving forward.

Mr. Newton's office did call Mr. Farrell as I requested. Mr. Farrell's office indicated that they had not seen the memorandum from Mr. Newton. Upon further searching, Mr. Farrell's office did find the memorandum submitted by Mr. Newton and indicated that it had been in their office since the middle of August. Evidently Mr. Farrell was concerned as to whether or not he had the Agency's authority to continue working on this matter. Mr. Farrell evidently also indicated that he did not know what priority the Agency had placed on this matter.

As I indicated to you during our telephone conversation, Pacific Wood Treating Corporation continues and will continue to look to resolve the matters that are outstanding through means other than litigation. As you and I discussed, and it must be reiterated, unless these consultants can reach an agreement as to a ground water monitoring system or reach a deadlock as to an appropriate ground water monitoring system, we are at a stand still.

Pacific Wood Treating Corporation has spent thousands and thousands of dollars to try to comply with the regulations and requirements of EPA as they have to do with the Ridgefield Brick And Tile site. We stopped using Sweet, Edwards as consultants because of comments made by employees of the Agency. In your letter of August 7, 1990, the Agency is now suggesting that the Sweet, Edwards report was not all that bad. The purpose of our meeting in Seattle was to try and open communication lines so that a closure plan with appropriate ground water monitoring systems could be approved. The reports from David Newton were submitted to the Agency without comment until the latest complaint was filed.

You and I should not be the ones to argue at this point about the merits or lack of merits of the ground water monitoring system proposed by the corporation. The professionals who are trained in this area should be the people discussing the geological conditions on this particular site.

Where can we go from here? In my discussions with you, both during our meeting and on the telephone, and by this letter, I continue to indicate to you a complete and total willingness on the part of Pacific Wood Treating Corporation to do what is necessary to meet the terms of the Consent Order executed in 1986. This Consent Order requires the Agency to actively participate in reviewing, commenting on and, if appropriate, the closure plan. The company is frustrated and upset. The company cannot understand why the Agency has decided to proceed through another complaint. This is particularly true in light of the fact that the precipitating factor in the filing of the second complaint was a page letter from your consultant in September of 1989. The EPA did not even provide the company with a copy of this letter, nor did the EPA give the company a chance to respond to this letter before the complaint was filed. You have solicited our offer as to how to resolve the complaint that is now outstanding. Our proposal is no different than the one that we suggested at our meeting in Seattle earlier this year.

1. The consultants must either come to a uniform conclusion as to the ground water monitoring system that is needed on the site or they must tell us that they cannot come to a uniform decision. If they cannot come to a uniform decision, it is my suggestion to Pacific Wood Treating Corporation that they hire another professional to review Mr. Newton's work to see if his work is supportable. If his work is supportable, we will look to EPA to have its work reviewed. If Mr. Newton's work is not supportable, we will submit a new ground water monitoring system. We will continue to look to the Agency to discharge its obligations under the Consent Order of 1986 which requires

cooperation in the determination of an appropriate ground water monitoring system.

2. As to the financial assurance requirements, it must be obvious to you and the Agency that somebody misread the regulations. As I indicated in our meeting in Seattle and during our telephone conversation, a new complaint was not necessary to resolve this situation. We will forward to you an accounting showing what has been spent to date and the balance we believe should be paid to the trust.

3. The Part B Application continues to cause the greatest problem for the company. Under the terms of the 1986 Consent Order, all matters between EPA and Pacific Wood Treating Corporation were settled, including any requirement for such an application.

4. Since there is no current requirement under the Consent Order entered in 1986 for a Part B Application, there can be no penalty for Pacific Wood Treating Corporation's not submitting such an application.

With reference to the other penalties proposed, it appears to me that the problem here is not a lack of willingness by Pacific Wood Treating Corporation to meet the requirements of the Consent Order of 1986 but, rather, a lack of communication from the Agency in discharging its obligations under that Consent Order.

It is my continued hope that we can work together to get the matters between the parties resolved. Pacific Wood Treating Corporation feels somewhat like a fish swimming around on the shore. If we are going to be successful in closing the RBT site in accordance with the Agency's regulations and requirements, then we need the Agency's continued cooperation toward that end. The continuation of the adversarial posture taken by the Agency's staff and the company's employees is not getting the job done. Your letter of August 7, 1990, and the current complaint pending against the company are not helping to reach the result that both the Agency and the company wish.

I appreciate the time you took on the telephone with me and our meeting in Seattle earlier this year which are, hopefully, leading to getting these matters resolved.

We may, in fact, have to get to the adversarial stage at some point, but I hope that the cooperation that you have

indicated and our continued willingness will go a long way to solve the existing apparent conflicts.

Very truly yours,

Scott Howard

CSH/emvb

Enclosure

Cc: Pacific Wood Treating Corporation
Attention: Gregory E. Niedermeyer

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November 7, 1990

Mr. John Hamill
Office of Regional Counsel
Environmental Protection Agency
Region X
1200 Sixth Avenue, SO-125
Seattle, Washington 98101

Dear Mr. Hamill:

Re: Pacific Wood Treating Corporation
EPA ID No. WAD 009036906

Enclosed is a copy of the Memorandum from David J. Newton to Robert S. Farrell, dated August 13, 1990, which, through inadvertence, we failed to enclose in our letter of November 6, 1990.

We apologize for any inconvenience this oversight may have caused you.

Very truly yours,

Scott Howard

CSH/emvb

Enclosure

Memorandum

TO: Robert S. Farrell

FROM: David J. Newton, P.E., C.E.G.

SUBJECT: Pacific Wood Treating Corporation, RBT Landfill Site, Ridgefield, Washington. Findings based on 1989-90 data collection, and response to your letter (9/21/89) expressing groundwater monitoring concerns.

DATE: 8/13/1990

Dear Mr. Farrell:

This memo presents new data and findings stemming from water level and water quality measurements collected at the site during the 1989-1990 wet season. In addition, the memo presents comments in responses to your September 21, 1989 letter submitted to Marcia Bailey of the EPA Region X. David J. Newton Associates, Inc., (DNA) and Pacific Wood Treating Corporation (PWTC) received the letter from the EPA on March 29, 1990.

The intent of this memo is to update you on recent DNA evaluations of additional site data that support previous groundwater monitoring proposals presented by PWTC to the EPA and to obtain your input in order to close the file on this case.

INTRODUCTION

Groundwater monitoring plans have been presented to EPA by PWTC for the RBT landfill Site at Ridgefield, Washington. The plans are intended to monitor the quality of groundwater samples periodically obtained from the uppermost zone of saturation beneath the landfill. The purpose of the water quality monitoring is to detect wood treatment chemicals that might migrate from ash material buried in a landfill constructed with a soil-bentonite bottom liner.

Geological investigations and groundwater monitoring work indicate that seasonal perching of groundwater occurs during the winter and spring. Perching results from impedement of vertical water percolation by the weathered, low-permeability cap on the upper Troutdale Formation. The bottom liner of the landfill is

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approximately 5 to 10 feet above the Troutdale Formation, and is within the vertical limits of the saturated zone of the perched system. Groundwater perching saturates the entire zone between the landfill bottom and the top of the Troutdale Formation, providing opportunities to detect contaminants in the immediate proximity of the landfill bottom, if any should escape from the landfill.

Conclusions of previous reports (see reference list) indicated that the perched system will yield water for sampling and water quality analysis on a seasonal basis. Since the perched water is in contact with the bottom of the landfill, water quality testing of samples from the saturated zone will satisfy the EPAs' requirement for "timely" detection much better than testing from the regional aquifer that is located approximately 180 feet below the site.

Sampling of water from the landfill interior and from the sampling wells has been done by Tetra Tech, representing the EPA, in addition to sampling by PWTC. Tetra Tech has also tested the samples for wood treatment contaminants to supplement analyses by 3 other qualified laboratories.

Water quality analyses consistently reflect no detection of wood treatment compounds at the detection limits of the test. These findings also apply to samples of water withdrawn from the landfill interior through a toe-drain system. This system discharges water from the cell interior to a holding tank for disposal by a licensed disposal contractor. In one case, arsenic was detected in a toe-drain sample. However, the concentration was below the EPA health-based criteria by a multiple of 8.

In light of hydrogeologic and water quality conditions, a system that will monitor the quality of water from the landfill interior, and the quality of water from the uppermost perched groundwater zone at the bottom of the landfill, enhances detection opportunities in the immediate proximity of the landfill, above the uppermost aquifer that is used for water supply. Considering the results of water quality analyses to date, groundwater perching near the landfill bottom, state-of-the-art construction of the landfill, and the assumption that perched groundwater could ultimately percolate to the regional aquifer below, it is reasonable to conclude that monitoring of

the perched zone, with improvements recommended herein, is appropriate for the site.

Recommendations are made in the "recommendations" section of this report for improvements to the existing monitoring system based on analysis of monitoring data from the 1989-90 season. Recommendations presented in previous reports have been revised in certain cases according to piezometric surface mapping.

OBSERVATIONS

Data was collected sporadically throughout the wet season by Dr. Bryant Adams of Pacific Wood Treating Corporation. Well depths were measured using an electric probe suspended on a cable that was marked with depth indicators. Water level measurements for the 1989-1990 and the 1987-1988 wet seasons are shown in Table 1. Water level measurements were not taken for the 1988-1989 wet season.

Maps showing the groundwater surface of the upper perched groundwater zone were constructed using data from the 1989-1990 monitoring season. Maps were constructed for January 12 and 15, 1990 (figs. 1 and 2) and show contours of the groundwater surface and inferred groundwater flow lines for each date. Maps could not be constructed for other dates due to dry wells or lack of data.

Alternate interpretations of well data are shown in figures 3 and 4. All interpretations (figs. 1-4) show a trough, or low point, reflecting groundwater flow beneath the landfill toward the northwest. Figures 1 and 2 also show troughs that reflect groundwater flow from beneath the landfill toward the southeast. Contours on all four of the maps show flow gradients toward the landfill site from the east and northeast. Different interpretations are possible because the density of the data does not allow for a unique interpretation.

It should be noted that the direction of groundwater flow for the 1989-1990 season is similar to the direction presented in previous reports. However, refinements based on 1989-1990 data reflect a component of flow toward the northwest. During the 1987-88 monitoring season, most wells were dry (Table 1), and contour maps of the groundwater surface could not be constructed. Therefore, using very limited data, the groundwater flow

direction was inferred to be mainly southward along the surface of the Troutdale Formation, consistent with conditions reflected on figures 1 and 2.

Changes in the perched groundwater surface beneath the site during the 1989-1990 season occur over a relatively short time period. Relief on the surface changed up to 26 feet in well B-1 over a three day period, and up to 36 feet between January 12th and March 23, 1990. Monitoring wells contain water during periods of greatest rainfall (November - March).

In contrast, the regional water table beneath the site fluctuates within narrow vertical limits over a much longer time period. The regional aquifer is at an approximate elevation of 20 feet mean sea level (MSL), 182 feet below the landfill bottom. A Washington State Department of Ecology observation well, located about 8 miles northwest of the site, penetrates the regional aquifer. This well shows that the regional water table fluctuates 6 feet in a given year (fig. 6). Figure 6 also shows that fluctuations of the regional water table are about six months behind precipitation curves. This data is in contrast to the monitoring wells at the site, which seem to indicate relatively rapid response to seasonal rainfall and the show of water in wells.

Figure 5 shows geologic relationships and sediment permeabilities for different sediment types at the site. Note the contrasts in permeabilities for different sediments. These contrasts promote lateral groundwater flow, near the base of the landfill, that is likely to intersect shallow moitoring wells long before it intersects wells penetrating the regional aquifer at depth.

Precipitation collected near the site is shown in Table 2. Graphs of precipitation for the last 6 years are shown on figure 6. Precipitation at the site is characterized by a drying period starting in late May or early June with the lowest rainfall in July or August (Table 2 and Figure 6). The wet season begins with increasing rainfall in September or October and peaks with the wettest period usually in November. Rainfall then tapers off between December through February followed by a slight spring increase usually in May.

WATER QUALITY

Results of lab tests on water quality at the site from effluent sampled directly from the landfill toe drain, and from nearby wells are presented in Table 3. This table summarizes laboratory data for key toxicants associated with wood treatment. Lab reports complete with chain-of-custody documentation and full chemical analyses are available for review upon request.

It should be noted that water quality of the effluent is well below EPA published quantitation limits since all toxicants, except one, remain undetected. This raises the question of the need for further detailed investigations or well improvements in addition to those discussed in the "recommendations" section of this report, since it is unlikely that nearby monitoring wells could detect toxicants in groundwater when they have been undetected in the toe drain.

DISCUSSION

As mentioned previously, there are two interpretations of the shape of the groundwater surface beneath the site. At this time, DNA geologists believe that the surfaces depicted in Figures 1 (Jan. 12) and 2 (Jan. 15) are more likely to occur than those in Figures 3 (Jan. 12) and 4 (Jan. 15). It is believed that the relatively permeable sand, which intersects the bottom of the landfill from the southeast and pinches out at the position shown on the figures, influences groundwater contours in the southeast portion of the study area. The sand would conduct the flow of water out of the area by the southeast side. Therefore, groundwater contours in Figures 1 and 2 reflect this interpretation.

Groundwater contours in the figures are high on the east, probably due to recharge entering from the upland area to the east. Groundwater contours in the northwest portion of the site may be influenced by the upper contact of the Troutdale Formation. The formation slopes toward the northwest in this area and may cause water to flow along and within the upper portion of the Troutdale Formation.

It should be noted that the geometry of the groundwater surface is speculative. Limited data points and the rapidly changing

nature of the surface may make other interpretations possible as more data is collected.

The presence of water in wells correlates to the period of greatest rainfall in the area, however, rapid daily changes in the groundwater surface beneath the site can not be directly correlated with local rainfall information at this time. Lack of correlation of rapid daily water level fluctuations may be due to the fact that rainfall data is collected from the Ridgefield City Sewer Treatment Plant located about 2 miles from the site, and therefore may not be accurate on a daily basis.

Comparisons of the 1989-1990 water level data with the 1987-1988 data show major changes in water levels (Table 1). During the 1987-1988 monitoring season, water was found consistently only in well B-5 with minor or trace amounts found only occasionally in other wells. Water was found in all wells except well B-2 during the last monitoring season. Local rainfall data shown in Table 2 show no major differences in precipitation amounts during the monitoring months of November 1987-May 1988, and monitoring months November 1989-May 1990. However, major differences in precipitation exist between the dry summer months preceding each wet monitoring season. Rainfall for June 1989-October 1989 was 7.33 inches, 2.79 times the rainfall that fell during June 1987-October 1987, which was only 2.63 inches (Table 2).

It is suggested that local rainfall amounts have major control over the presence of water in the monitoring wells, changing the groundwater surface greatly from wet and dry years and wet and dry seasons. This makes it possible to sample water that has passed beneath the landfill during periods of greatest chance for groundwater contamination, when groundwater is present at the landfill bottom. During dry periods there is little chance for migration of contaminants into the water table since it does not intersect the landfill bottom.

Conclusions discussed herein have not changed from those of previous reports. These conclusions are that the groundwater exists in a temporary perched condition, perched groundwater is suitable for monitoring and will provide timely detection of contaminants, and the regional groundwater table is not suitable for a timely detection of contaminants.

DISCUSSION OF EPA CONCERNS

In a September 21, 1989 letter to the EPA, you commented on the first monitoring report for the site entitled "Groundwater Monitoring Report for the RBT Landfill Site, Ridgefield, Washington, November 1987 through May 1988" dated December 28, 1988. You also commented on "Progress Report, Geological and Groundwater Site Characterization, Ridgefield Brick and Tile Site, Ridgefield, Washington" dated September 27, 1987. Responses to your concerns are addressed below:

* Recontouring of the top contact of the Troutdale Formation was done incorrectly.
Figure 1 shows the revised top contact of the Troutdale Formation.

* Rapid fluctuations of the water level, high coliform counts, as well as low chloride, nitrate, and sodium levels in well B-5 probably indicate the well is open to the surface, and does not reflect seepage from a nearby septic drainfield.
New data from the 1989-90 monitoring season (Table 1) shows rapid water level fluctuations in wells B-1 (Jan. 10, 11, 12, and 15), B-3 (Jan. 10, 11, 12, and 15), B-4 (Jan. 11, 12, and 15), B-5 (Jan. 10 and 11), and B-6 (Jan. 10 and 11). Only well B-5 had rapid water level fluctuations during the 1987-88 monitoring season. It seems highly unlikely that wells B-1, B-3, B-4, and B-6 developed openings to the surface between the 1987-88 and the 1989-90 monitoring seasons. It seems more likely that the wells are all responding to rapid fluctuations in the perched water table caused by local rainfall transmission through the sediments during the 1989-90 monitoring season.

The soil around well B-5 may have had a higher moisture content than the other wells during the 1987-88 monitoring season due to the nearby septic drainfield - thus causing water to appear in well B-5 when the other wells were relatively dry. More water quality data is being gathered on the type of coliform present in well B-5, which should help clear up this question.

* Water levels were not reported in elevations, it was not known if the absence of a reading signified a dry well or a reading not taken, water levels with respect to time were not shown for all

wells, and groundwater contour maps or maps showing groundwater flow patterns were not presented.
Tables 1 and 2 show data for the 1987-1988, and the 1989-1990 monitoring seasons. Water levels are reported in elevations complete with dates readings were taken when wells were dry. Figures 1-4 show the groundwater contours for different times, as well as groundwater flow directions inferred from groundwater contours.

* It has not been shown that groundwater is indeed perched on top of the Troutdale Formation surface.
It seems that groundwater may in part flow laterally through the upper part of the Troutdale Formation. In well B-4 the screen is open only to the Troutdale Formation and water levels fluctuate up to 20 feet, therefore perching may be taking place at a slightly lower level. However, the influence of precipitation on water levels in wells, the rapidly changing groundwater surface, and elevation of the regional water table in the site area (over 182 feet lower) make it unlikely that water levels in wells reflect changes in the regional water table - signifying a temporary perched condition.

* The existing monitoring system is not adequate for the "timely" detection of contaminants.
It is concluded that monitoring the temporary perched water table enhances "timely" detection of possible landfill contaminants in the immediate proximity of the landfill. Using the existing wells, along with the above improvements to sampling, will provide "timely" detection of contaminants. Monitoring at the regional water table (elev. 20 feet) about 182 feet below ground surface reduces opportunities to meet the EPA's "timely" monitoring requirement. The temporary perched water bearing zone at a much higher level, and proximal to the landfill bottom, would detect contamination months or years before wells penetrating the regional aquifer would.

Rainfall data in Table 2 shows that the dry months each year have, on average, more rainfall than occurred during the 1989-90 monitoring season. Therefore, it is likely that during most years water will be available for sampling at least four times during the wet season, providing a regular opportunity for sampling.

RECOMMENDATIONS FOR FURTHER MONITORING

It is recommended that requirements for monitoring at the site be tailored to be "site specific" in light of these findings:

* Groundwater exists at the landfill bottom in a seasonal perched condition.
* The probability that contamination migration would occur is greatest during the seasonal perched condition when groundwater intersects the bottom of the landfill. During the dry seasons, the potential for migration of contaminants from the landfill is remote, since water is not available to serve as a transport medium.
* The regional groundwater table is remote to the landfill relative to the uppermost perched system, reducing opportunities for timely detection of contaminants before they have migrated a significant distance from the landfill.
* A wet season has been defined by observing precipitation records as generally starting within the months of September or October that follows a summer dry season.
* Possible contaminants at the site have been identified as consisting of byproducts of wood treatment procedures.

Recommendations for "site specific" monitoring are as follows:

* The beginning of the monitoring season is defined as the first show of a rising water table in the wells surrounding the site.

* When wells dry up at the end of the monitoring season, well levels will be checked monthly thereafter during the dry season.

* Precipitation records will be kept in order to determine when the wet season begins (usually in September or October). When precipitation records show an increase in rainfall amount from week to week, water levels in wells will be checked weekly to insure that the first show of water in the wells is not missed.

* Water quality samples will be taken monthly during the monitoring season. The first sample will be taken at the first show of sufficient water in the sampling wells (sampling procedures outlined by the EPA will be followed). Samples

will be taken from wells B-1 and B-5 (up gradient), and from wells B-6 and B-3 (down gradient), and the toe drain. The first show of water may contain the highest concentrations of toxicant after the long dry interval preceding the monitoring season. Other samples will be taken at monthly intervals until the wells dry up in response to the decrease in rainfall.

* The following toxicants are proposed as "markers", and will be compounds tested for during routine water quality testing. These toxicants include; Pentachlorophenol (EPA method 8270), Benz (A) Pyrene (EPA method 8270), and Arsenic (EPA method 7061). These toxicants have been identified as byproducts of the wood treating industry and are present in low concentrations in the waste material. If any of these markers are detected in the sampling wells, testing will be increased to include the full range of possible contaminants.

CLOSING COMMENTS

We are prepared to discuss this preliminary report with you following your review. We will be in touch with your office to set up a time for a phone conversation. Upon conclusion of our discussions, arrangements have been made to convey our discussion results to the EPA. The results of our discussions and subsequent conference with the EPA will set the basis for a formal report and other follow-up activities that may be necessary.

REFERENCES

(previous reports)

o "Progress Report, Geological and Groundwater Site Characterization, Ridgefield Brick and Tile Site (RBT SITE), Ridgefield, Washington" prepared by David J. Newton Associates and dated September 27, 1987.

o "Groundwater Monitoring Report for the RBT Landfill Site, Ridgefield, Washington; November 1987 though May 1988" prepared by David J. Newton Associates and dated December 28, 1988.

o "RBT Landfill, Ridgefield, WA., Review of the Groundwater Monitoring Report by Newton Assoc., December 28, 1988" prepared by Robert S. Farrell and dated September 21, 1989. DNA and Pacific Wood did not receive word of this letter until March 29, 1990.

David J. Newton Associates, Inc.
1201 SW 12th Avenue, Suite 620, Portland, OR 97205
TEL: (503) 228-7718, FAX (503) 228-7781

TABLE - 1 WELL DATA

WELL NO.	B-1	B-2	B-3	B-4	B-5	B-6	B-7
WELL BOTTOM	185.0	183.3	182.3	180.1	180.5	188.3	187.4
GROUND ELEV.	239.7	210.5	205.1	205.5	215.0	228.6	207.3
DEPTH (ft. from ground)	54.7	27.2	22.8	25.4	34.5	40.3	19.9
STICK-UP (FT.)	2.5	0.7	3.0	3.0	2.7	2.5	2.7
STORAGE (In.)	0	0	3.6"	?	2.4"	7.2"	1.8"
SCREENED TO	Tr, S	Tr, CS	Tr, CSlt.	Tr	Tr, S	S	Tr, S, CSlt
DATE (1987-88)							
SEPT. 24	DRY	DRY	DRY	DRY	DRY	DRY	DRY
OCT. 14	DRY	DRY	DRY	DRY	DRY	DRY	DRY
OCT. 29	DRY	DRY	DRY	DRY	DRY	DRY	DRY
NOV. 2	DRY	DRY	DRY	DRY	DRY	DRY	DRY
NOV. 25	DRY	DRY	DRY	DRY	DRY	DRY	DRY
DEC. 2	DRY	DRY	DRY	DRY	182.8	DRY	DRY
DEC. 23	DRY	DRY	DRY	DRY	181.1	DRY	DRY
DEC. 30	DRY	DRY	DRY	DRY	181.1	DRY	DRY
FAN. 8	DRY	DRY	DRY	DRY	181.1	DRY	DRY
JAN. 18	DRY	DRY	DRY	DRY	186.4	DRY	DRY
JAN. 20	DRY	DRY	DRY	DRY	186.5	DRY	DRY
JAN. 21	DRY	DRY	DRY	DRY	185.4	DRY	DRY
JAN. 22	DRY	DRY	DRY	DRY	184.1	DRY	DRY
JAN. 25	DRY	DRY	DRY	DRY	183.0	DRY	DRY
JAN. 27	DRY	DRY	DRY	DRY	182.1	DRY	DRY
JAN. 28	DRY	DRY	DRY	DRY	181.3	DRY	DRY
JAN. 29	182.5	DRY	DRY	DRY	187.3	DRY	DRY
FEB. 4	T	DRY	DRY	DRY	181.7	DRY	DRY
FEB. 10	T	DRY	DRY	DRY	189.1	DRY	DRY
FEB. 18	T	DRY	DRY	DRY	187.6	DRY	DRY
FEB. 19	T	DRY	DRY	DRY	185.1	DRY	DRY
MARCH 9	T	DRY	DRY	DRY	189.4	DRY	DRY
MARCH 18	T	DRY	DRY	DRY	181.9	DRY	DRY
MARCH 25	T	DRY	DRY	DRY	189.8	DRY	DRY
MARCH 26	T	DRY	DRY	DRY	187.4	DRY	DRY
APRIL 1	T	DRY	DRY	DRY	184.1	DRY	DRY
APRIL 5	T	DRY	DRY	DRY	188.0	DRY	DRY
APRIL 13	T	DRY	DRY	DRY	181.9	DRY	DRY
APRIL 18	T	DRY	DRY	DRY	*180.8	DRY	DRY
APRIL 28	T	DRY	DRY	DRY	*180.8	DRY	DRY
MAY 2	T	DRY	DRY	DRY	*180.8	DRY	DRY
MAY 10	T	DRY	DRY	DRY	*180.8	DRY	DRY
MAY 16	T	DRY	DRY	T	*180.8	T	T
MAY 23	DRY	DRY	DRY	T	*180.8	DRY	DRY

TABLE - 1 WELL DATA CONTINUED

WELL NO.	B-1	B-2	B-3	B-4	B-5	B-6	B-7
DATE (1990)							
JAN. 10	217.0	DRY	183.5	203.4	205.6	191.2	NM
JAN. 11	212.9	DRY	182.9	203.5	202.4	189.3	NM
JAN. 12	221.6	DRY	182.8	200.7	201.6	189.2	*188.0
JAN. 15	195.2	NM	183.1	201.6	201.3	189.1	*187.9
JAN. 18	NM	NM	NM	NM	205.4	NM	NM
MARCH 23	DRY	DRY	183.0	191.0	183.3	*188.9	*187.9
MARCH 28	DRY	NM	182.7	201.3	181.9	*188.9	*187.9
APRIL 9	DRY	DRY	*182.6	183.0	181.2	*188.8	*188.0
JUNE 8	DRY	DRY	*182.6	181.2	182.4	*188.8	*188.0
JUNE 15	DRY	DRY	*182.6	200.2	184.1	*188.9	*188.0
JUNE 22	DRY	DRY	*182.6	185.6	181.5	*188.9	*188.0
JULY 3	DRY	DRY	*182.6	185.0	181.2	*188.9	*188.0

T = Trace
NM = Not Measured
Tr = Troutdale Formation
S = Sand
Slt = Silt
C = Clay
* = Interpreted as a dry well. Piezometer measured storage in bottom of well.
All values are in feet above sea level unless otherwise specified.

TABLE - 2 MONTHLY PRECIPITATION DATA
(Ridgefield City Sewer Treatment Plant)

YEAR	1983	1984	1985	1986	1987	1988	1989	1990
MONTH								
JAN.	6.85	3.54	0.75	6.88	7.16	5.46	4.58	10.42
FEB.	8.9	4.7	3.5	5.83	4.87	5.75	2.73	5.03
MARCH	6.7	4.2	4.16	2.75	6.55	4.35	6.62	2.96
APRIL	2.8	4.9	1.2	2.45	1.83	2.76	2.87	2.44
MAY	1.6	4.7	1.1	3.03	2.36	4.55	1.94	2.29
JUNE	3.98	4.3	1.1	0.62	0.3	2.26	1.16	
JULY	2.7	0	1.49	1.06	0.92	0.46	1.1	
AUG.	2.6	0.45	0.67	0.07	0.57	0.6	1.38	
SEPT.	1.45	2.1	2.94	4.45	0.32	1.86	0.78	
OCT.	1.7	4.98	3.17	2.14	0.52	0.23	2.91	
NOV.	11.9	13.6	4.84	6.17	3.83	10.62	4.14	
DEC.	5.84	4.34	2.82	6.07	7.95	3.7	3.58	
TOTAL	57.02	51.81	27.74	41.52	37.18	42.6	33.79	
DRY MONTH TOTAL (June-Oct.)	12.43	11.83	9.37	8.34	2.63	5.41	7.33	

DRY MONTH AVE.= 8.19

All values are in inches.

TABLE - 3 WATER QUALITY DATA
RBT Site Groundwater Monitoring

COMPOUND	DATE SAMPLED	TOE DRAIN	WELL B - 1	WELL B - 4	WELL B - 5	EPA HEALTH BASED CRITERIA	PQL (published quantitation limit)	LAB REPORTING RESULTS
* PENTACHLOROPHENOL	3/16/87	U1	-	-	-	1000	1	CL
	1/29/88	U1	-	-	-			CAS
	5/23/88	U.3	-	-	-			EPA
	5/31/89	U10	-	-	U1			CAS
	1/12/90	U.6	U0.1	U0.1	U0.1			CAS
	6/4/90	U1	-	-	-			CAS
PAH's overall	3/16/87	U15	-	-	-	NONE	NOT APPLICABLE	CL
	1/29/88	U10	-	-	-			CAS
	5/23/88	U10	-	-	-			EPA
	5/31/89	U1	-	-	-			CAS
	1/12/90	U3	U3	U3	U3			CAS
BENZ (A) ANTHRACENE	5/23/88	U0.05	-	-	-	0.01	10	EPA
	1/12/90	U3	U3	U3	U3			CAS
	6/4/90	U5	-	-	-			CAS
* BENZ (A) PYRENE	5/23/88	U0.200	-	-	-	0.003	10	EPA
	1/12/90	U3	U3	U3	U3			CAS
	6/4/90	U5	-	-	-			CAS
DIBENZ (A,H) AUTHRACENE	5/23/88	U0.05	-	-	-	0.007	10	EPA
	1/12/90	U3	U3	U3	U3			CAS
	6/4/90	U5	-	-	-			CAS
* ARSENIC	3/16/87	U5	-	-	-	50	5	CL
	1/29/88	U5	-	-	-			CAS
	5/23/88	6	-	-	-			EPA - AL
	1/12/90	U5	U5	-	-			CAS
	6/4/90	U5	-	-	-			CAS
CHROMIUM	3/16/87	U5	-	-	-	50	5	CL
	1/29/88	U10	-	-	-			CAS
	5/23/88	U8	-	-	-			EPA - AL
	1/12/90	U5	U5	U5	U5			CAS
	6/4/90	U5	-	-	-			CAS
HEXACHLORODIBENZO-p-DIOXIN	6/4/90	U0.005	-	-	-	.000056	.010	QED
	6/4/90	U .00013	-	-	-			ENS

Concentrations in ug/l (ppb).
* = Proposed markers for sampling.
U = Undetected at specified limit.
- = No sample taken.

EPA - AL; Associated Laboratories, Orange, CA.
EPA; EPA Region X Lab Management System, Manchester, WA.
CAS; Columbia Analytical Services, 1317 S. 13th Ave., Kelso, WA.
CL; Columbia Laboratories, Inc., 36740 East Crown Pt. Hwy., Corbet, OR.
ENS; Enseco (Ca. Anal.), Sacramento Ca.
QED; 3324 Walnut Bend, Houston, Tx.

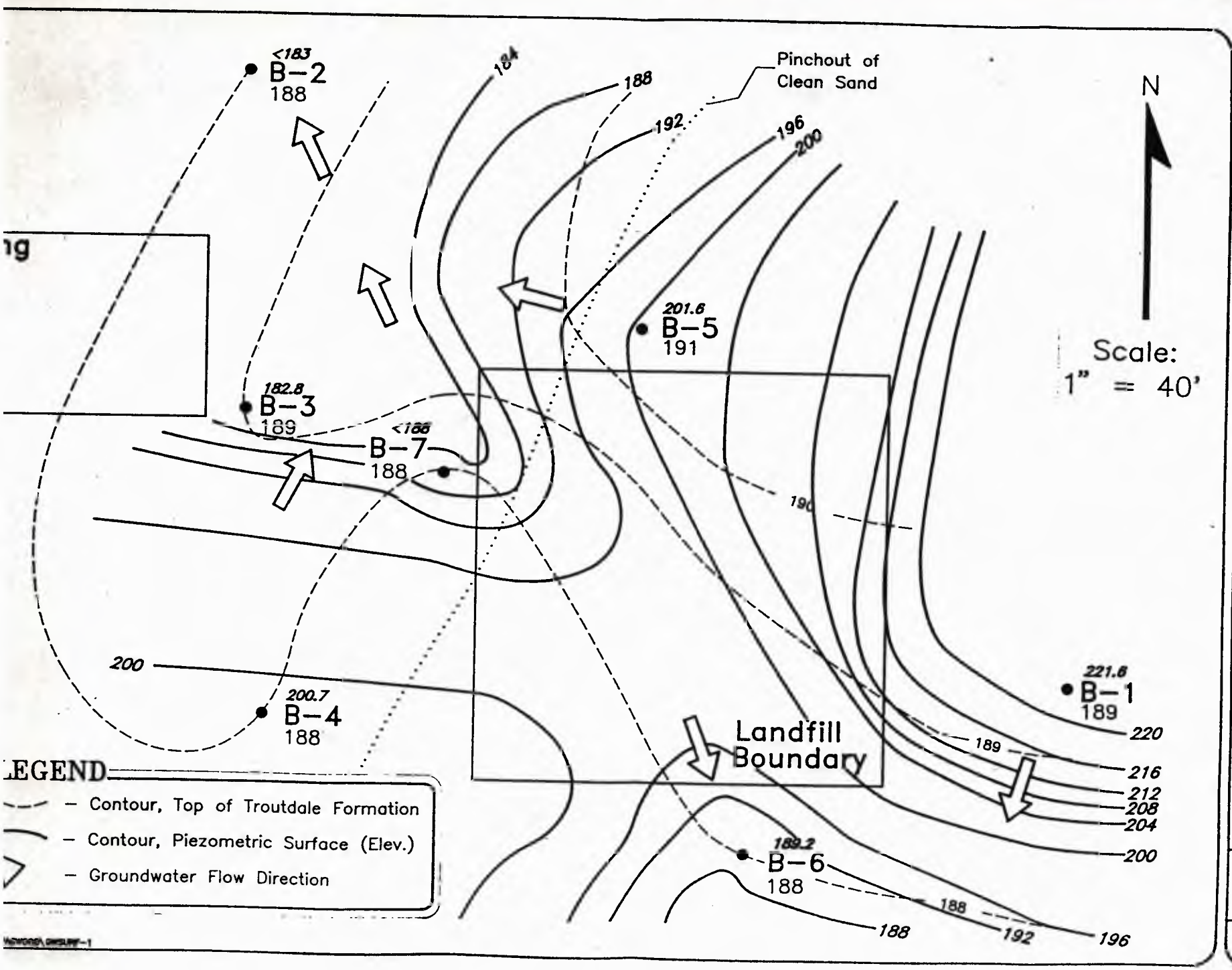

FIGURE
1

DAVID J. NEWTON ASSOC. INCORPORATED
CIVIL & GEOLOGICAL ENGINEERING
1201 S.W. 12TH AVE., SUITE 250
PORTLAND, ORE. 97205 • 228-7718 • FAX 228-7781
BRANCH 787 WILLAMETTE ST., SUITE 205
EUGENE, ORE. 97401 • 344-0855 • FAX 344-1857

PIEZOMETRIC SURFACE
Jan 12, 1990

DATE
JULY 1990

PROJECT NO.
212 GE 12 DN

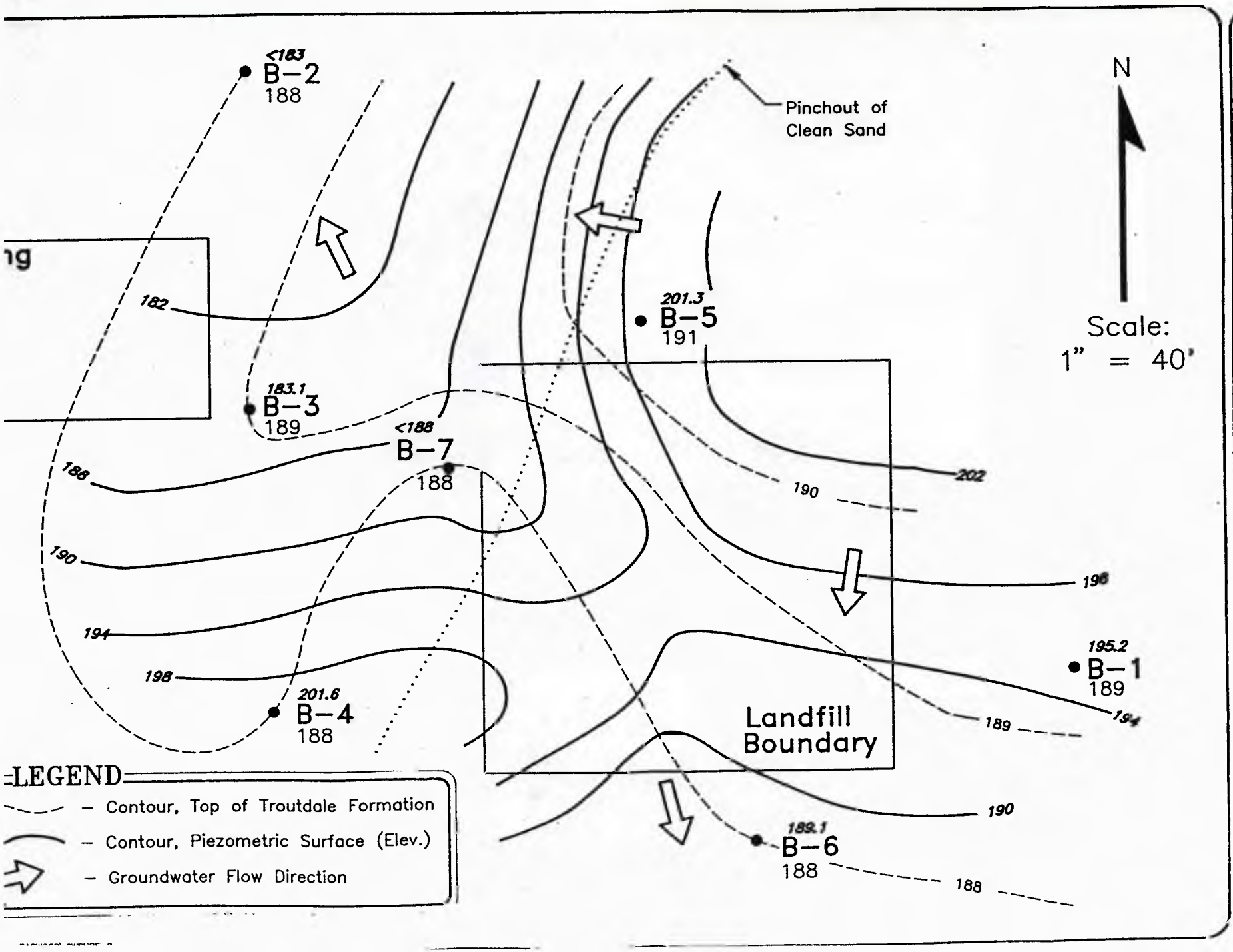

FIGURE 2

DAVID J. NEWTON ASSOC. INCORPORATED
CIVIL & GEOLOGICAL ENGINEERING
1201 S.W. 12TH AVE., SUITE 820
PORTLAND, ORE. 97205 • 228–7718 • FAX 228–7781
BRANCH 767 WILLAMETTE ST., SUITE 306
EUGENE, ORE. 97401 • 344–0688 • FAX 344–1827

PIEZOMETRIC SURFACE
Jan 15, 1990

DATE
JULY 1990

PROJECT NO.
212 GE 12 DN

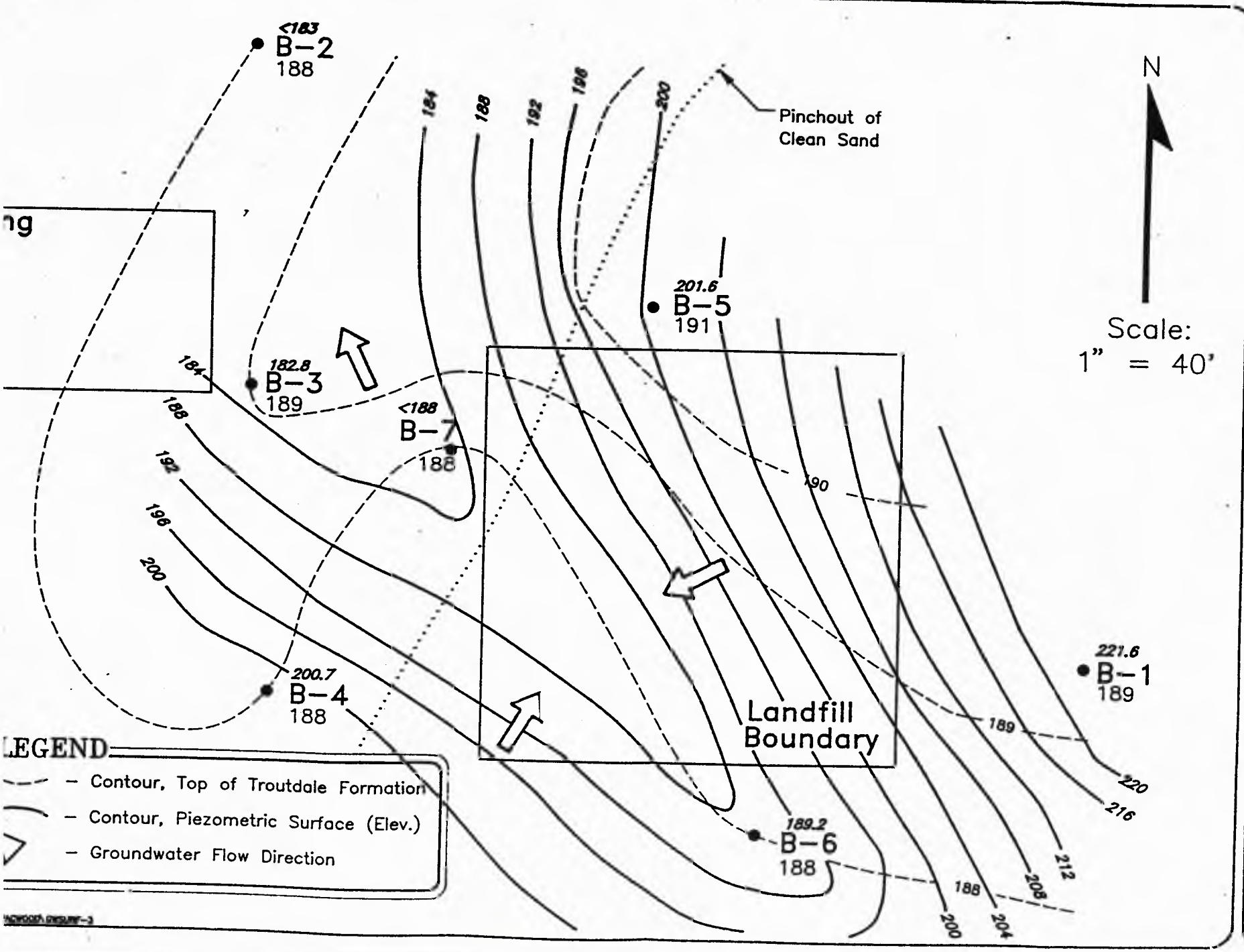

FIGURE 3

DAVID J. NEWTON ASSOC. INCORPORATED
CIVIL & GEOLOGICAL ENGINEERING
1201 S.W. 12TH AVE., SUITE 820
PORTLAND, ORE. 97205 • 228-7718 • FAX 228-7781
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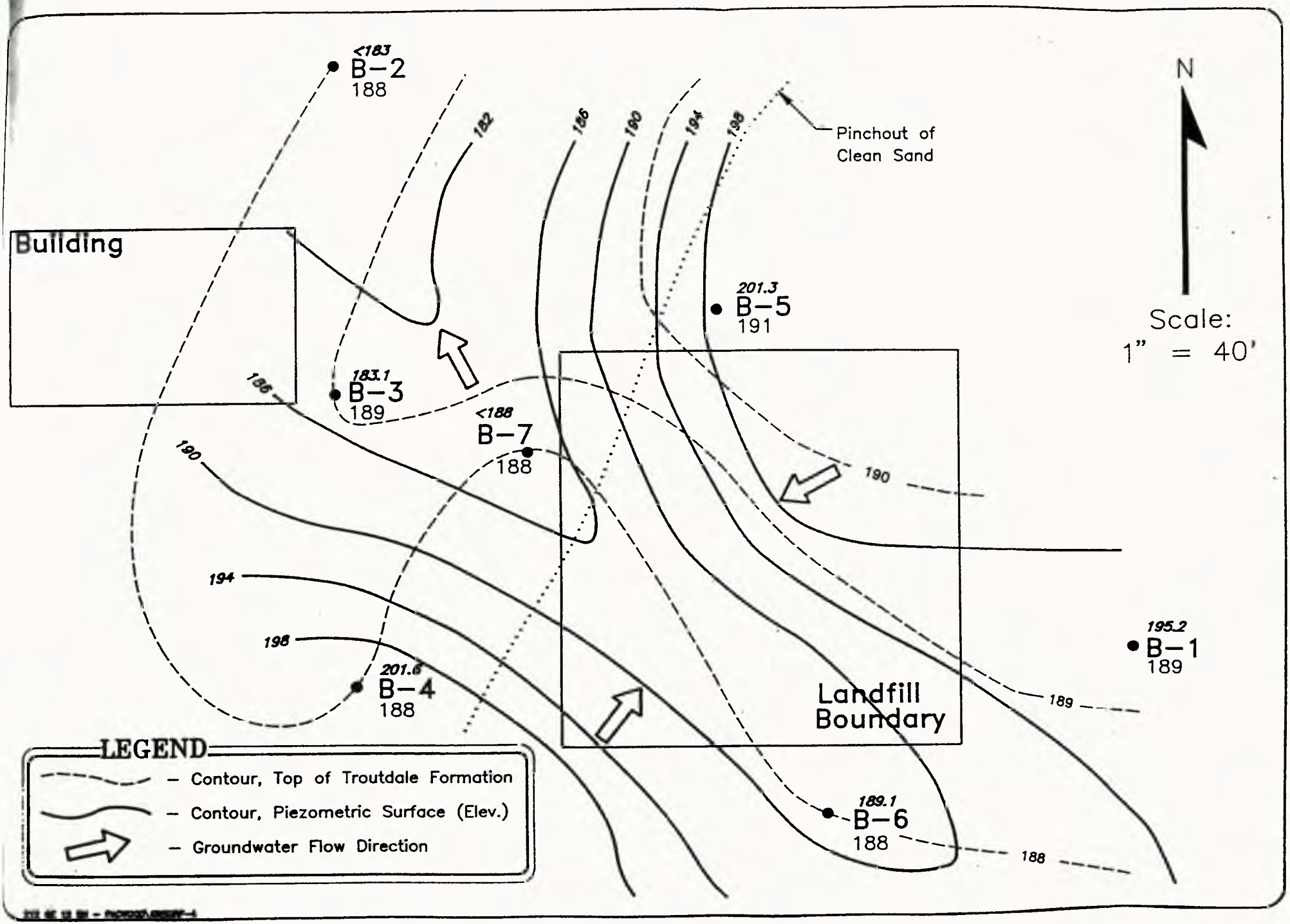
EUGENE, ORE. 97401 • 344-0855 • FAX 344-1827

PIEZOMETRIC SURFACE
Jan 12, 1990

DATE
JULY 1990

PROJECT NO.
212 GE 12 DN



FIGUI

DAVID J. NEWTON ASSOC.

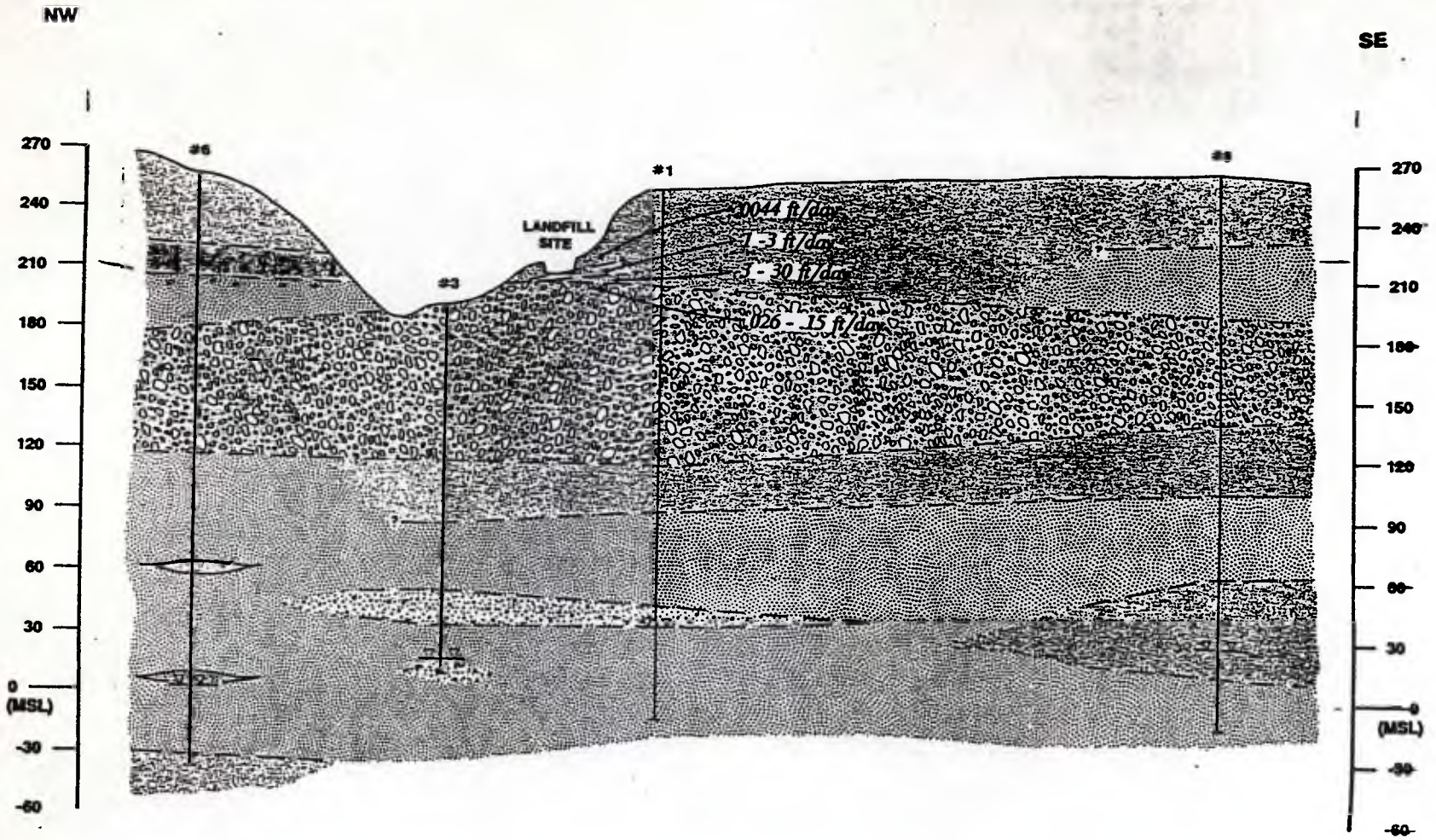
PIEZOMETRIC

DATE
JUL

PRO.
212

FIGURE 5

Geology and Auquifer Conditions as Reflected in Drill Logs



CLAY- MINOR SILT OR SAND IN AREAS, TAN TO DARK BROWN TO BLUE.

SILTY SAND- MEDIUM TO DARK BROWN.

FINE TO COARSE SAND- WELL-SORTED, NO SILT OR CLAY. BROWN.

GRAVELS- SILT, SAND, AND CLAY MATRIX SUPPORTED, MOD. TO WELL-CEMENTED OVERALL, LOOSE IN SOME AREAS.

COARSE SAND AND GRAVEL- BROWN TO BLACK.

▽ ▽ STATIC WATER LEVEL

300 0 300 600

Horiz. Scale: 1" = 300'
Vert. Scale: 1" = 60'

(Modified from *DNA Report Sept. 27, 1987*)

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DATE
JULY 1990

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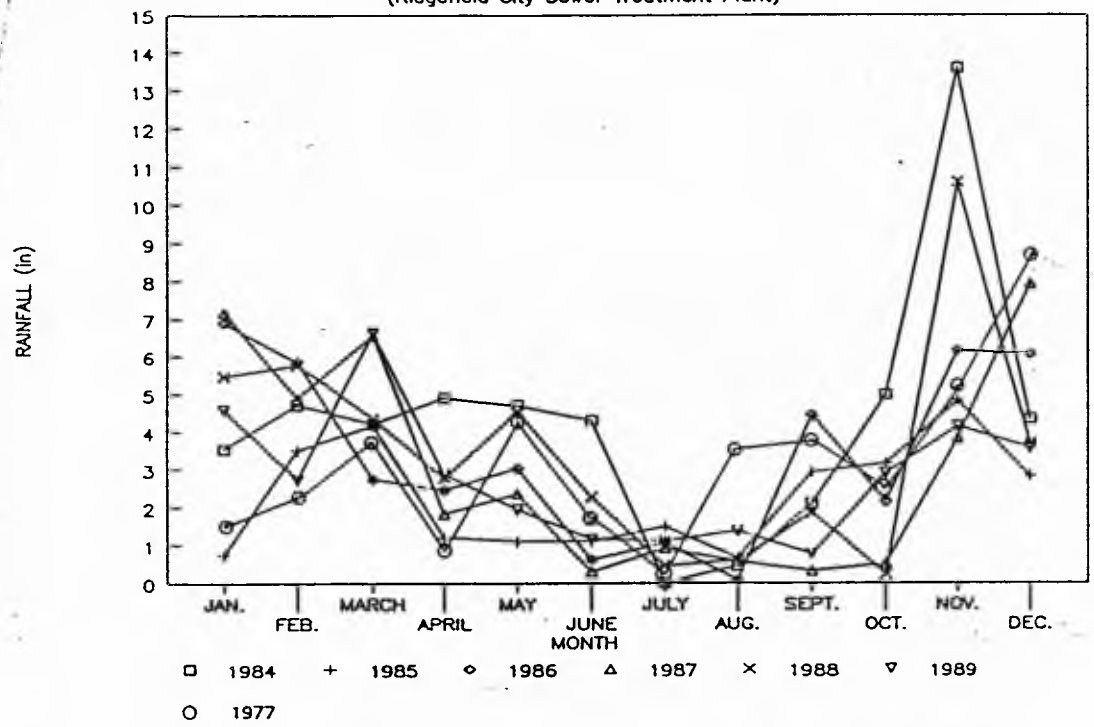
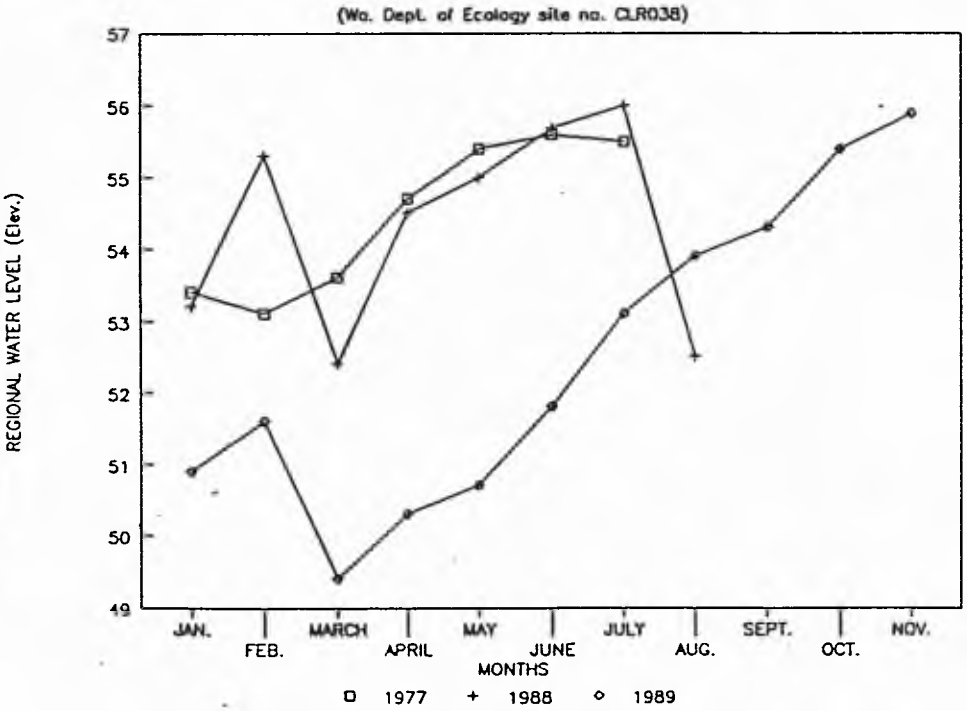
MONTHLY PRECIPITATION GRAPHS

(Ridgefield City Sewer Treatment Plant)



REGIONAL WATER LEVEL FLUCTUATIONS

(Wa. Dept. of Ecology site no. CLR038)



DESIGNED: _____ DRAWN: _____ CHECKED: _____ PROJECT NO. 212 GE 12 DN	**DAVID J. NEWTON ASSOCIATES** INCORPORATED CIVIL & GEOLOGICAL ENGINEERING 1201 S.W. 12TH AVE., SUITE 620 PORTLAND, ORE. 97205 • 228-7718	**Precipitaion and Water Level Fluctuation Graphs**	DATE 7/90 FIGURE **6**